FIG.1

FUNCTION BLOCK DIAGRAM SHOWING A PLL FREQUENCY
SYNTHESIZER ACCORDING TO FIRST EMBODIMENT
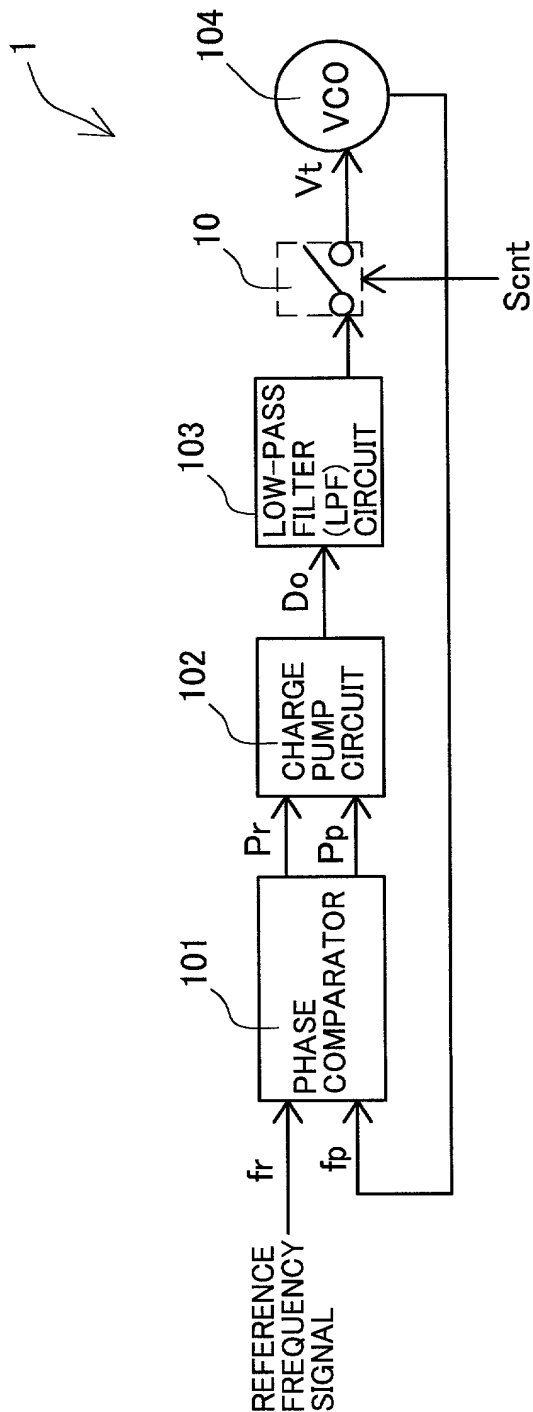
FIG.2

WAVEFORM DIAGRAM ILLUSTRATING OPERATING WAVEFORMS OF THE
PLL FREQUENCY SYNTHESIZER ACCORDING TO FIRST EMBODIMENT

PSEUDO
CORRECTION
PULSE

MAGNIFYING

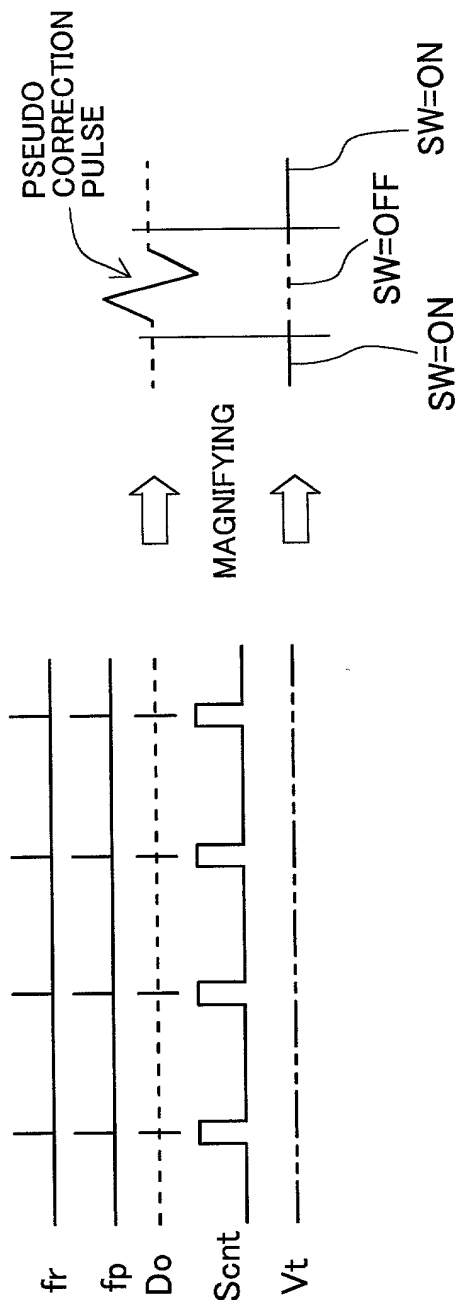SW=ON   SW=OFF   SW=ON

fr
fp
Do
Scnt
Vt

FIG.3

FUNCTION BLOCK DIAGRAM DEPICTING A SPECIFIC EXAMPLE OF THE
PLL FREQUENCY SYNTHESIZER ACCORDING TO FIRST EMBODIMENT

FIG.4

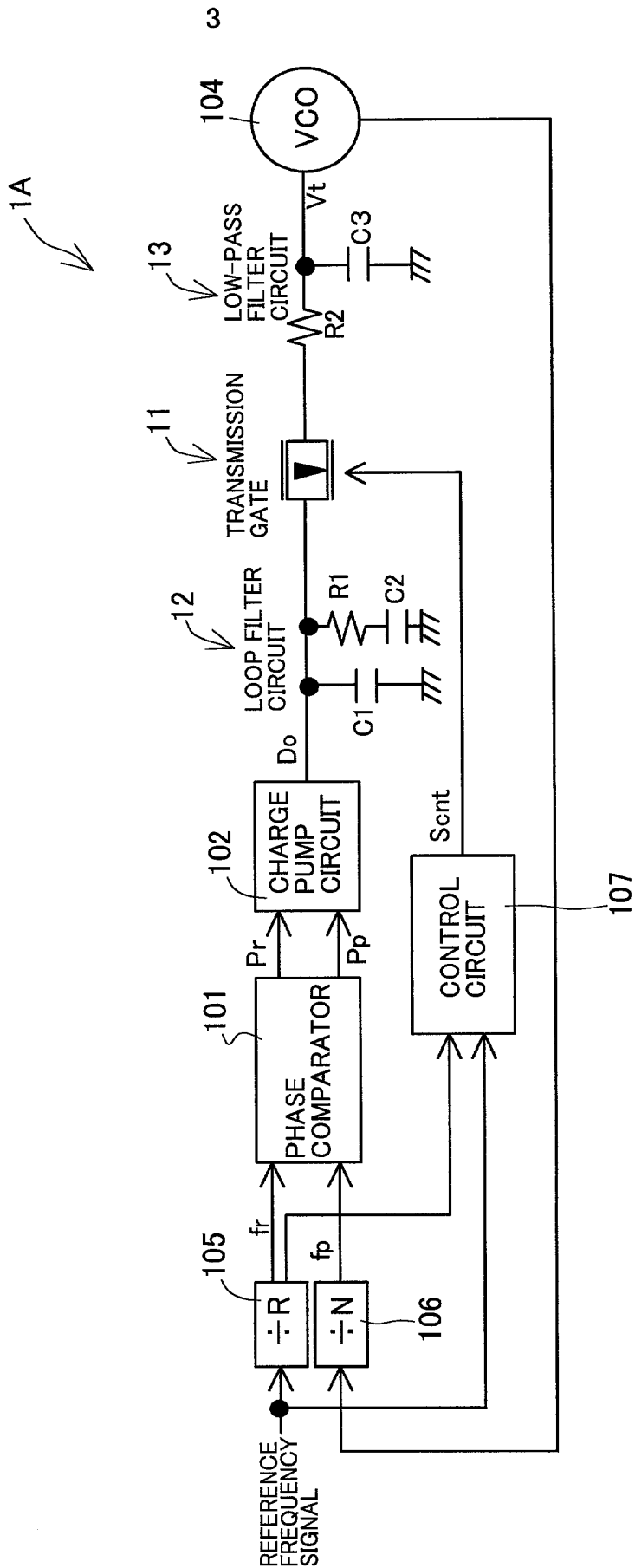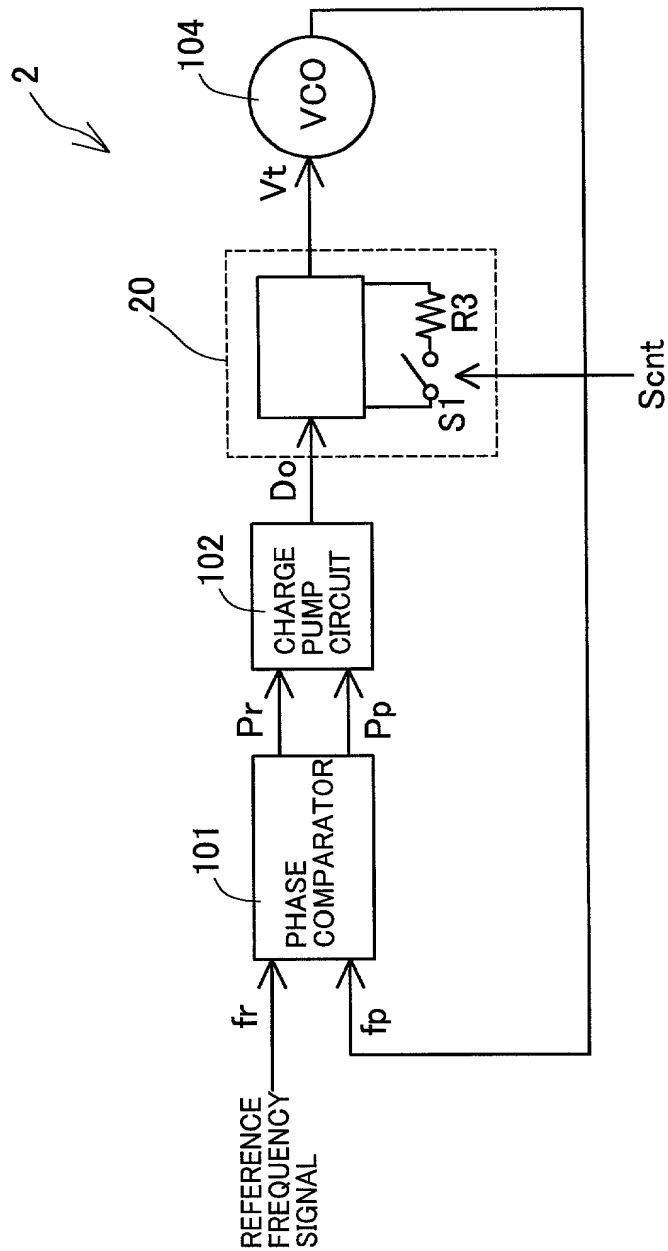FUNCTION BLOCK DIAGRAM SHOWING A PLL FREQUENCY
SYNTHESIZER ACCORDING TO SECOND EMBODIMENT

REFERENCE
FREQUENCY
SIGNAL

fr

fp

101

PHASE
COMPARATOR

Pr

Pp

102

CHARGE
PUMP
CIRCUIT

Do

20

S1

R3

Scnt

Vt

VCO

104

2

CIRCUIT DIAGRAM ILLUSTRATING SPECIFIC EXAMPLES OF
A LOW-PASS FILTER (LPF) CIRCUIT EMPLOYED IN SECOND
EMBODIMENT

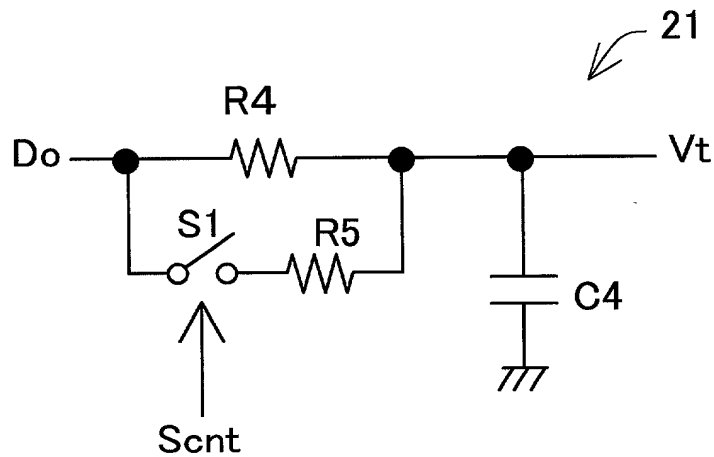# FIG.5A

TYPE WHEREIN PARALLEL PATHS ARE SELECTED

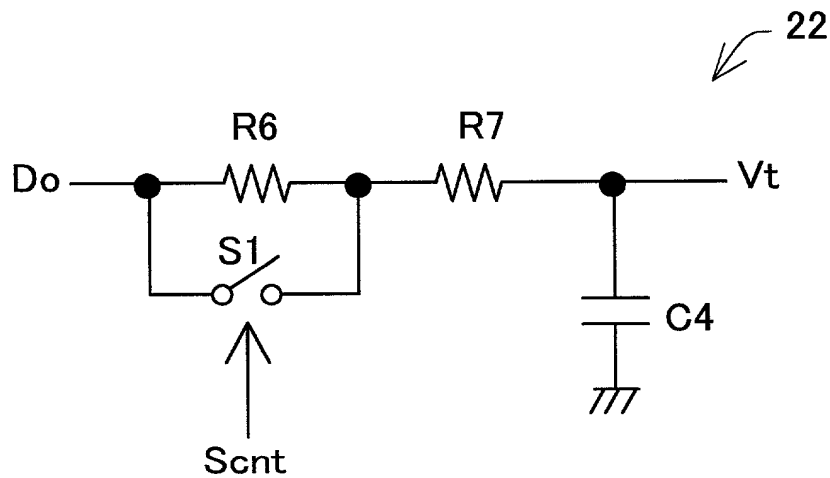# FIG.5B

TYPE WHEREIN SERIAL PATHS ARE SELECTED

FIG.6

FUNCTION BLOCK DIAGRAM DEPICTING A PLL FREQUENCY
SYNTHESIZER ACCORDING TO THIRD EMBODIMENT

REFERENCE
FREQUENCY → fr
SIGNAL

101
PHASE
COMPARATOR

Pr

fp

102
CHARGE
PUMP
CIRCUIT

Pp

Do

30
LOW-PASS
FILTER (LPF)
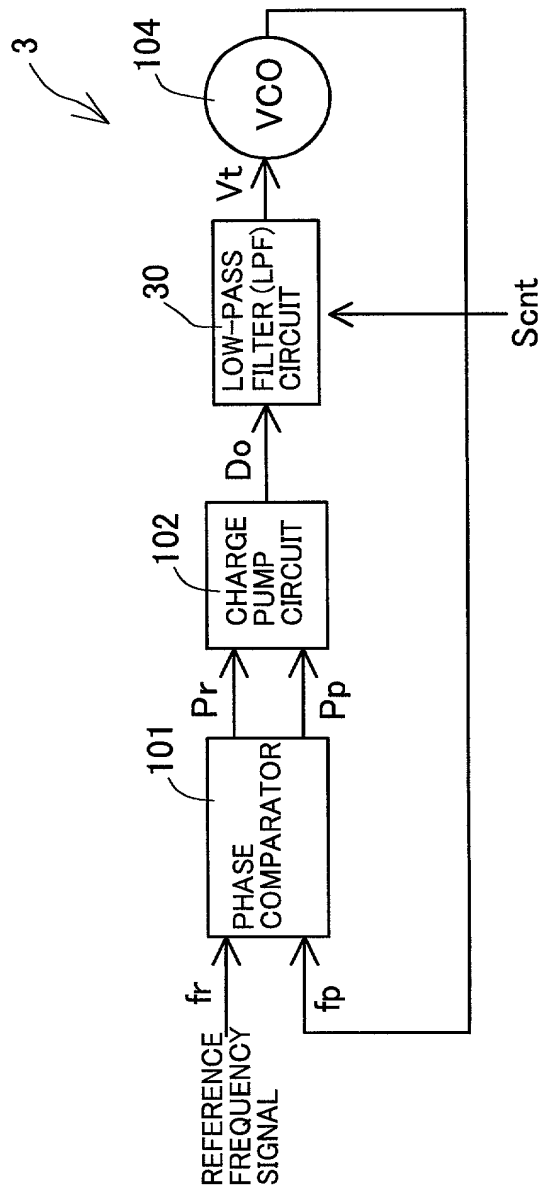CIRCUIT

Scnt

Vt

104
VCO

3

FIG.7

CIRCUIT DIAGRAM SHOWING A SPECIFIC EXAMPLE OF
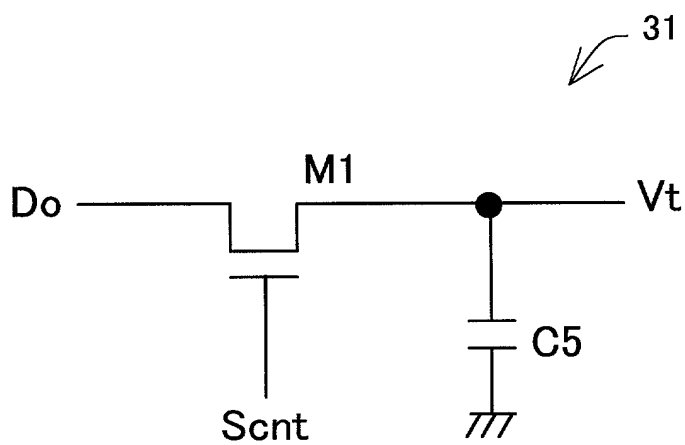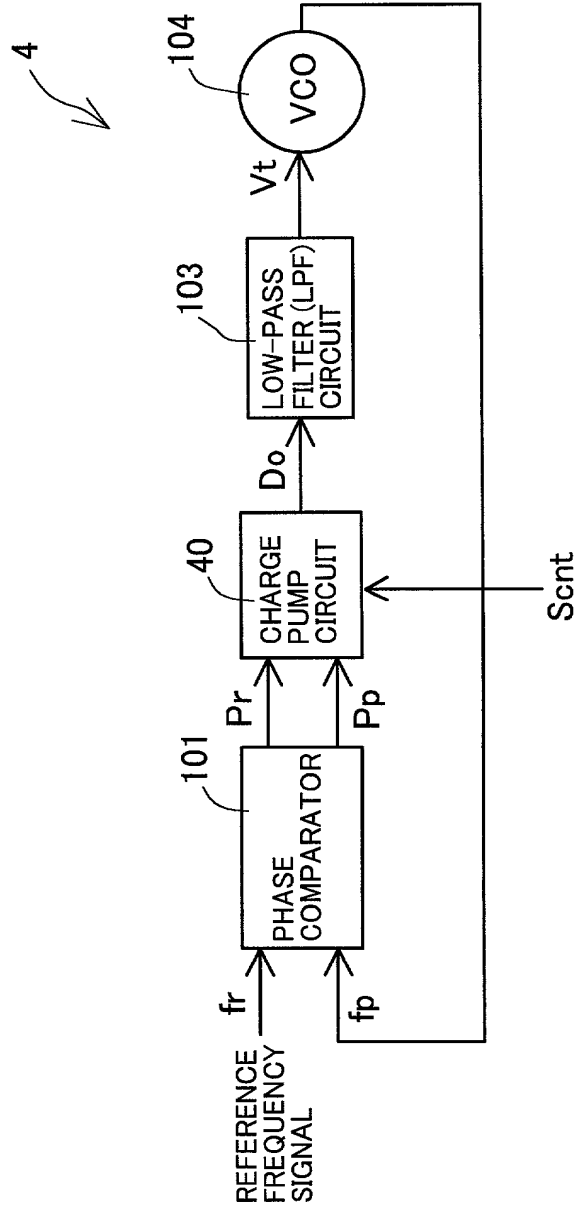A LOW-PASS FILTER (LPF) CIRCUIT EMPLOYED IN
THIRD EMBODIMENT

FIG.8

FUNCTION BLOCK DIAGRAM ILLUSTRATING A PLL FREQUENCY
SYNTHESIZER ACCORDING TO FOURTH EMBODIMENT

CIRCUIT DIAGRAM SHOWING SPECIFIC EXAMPLES OF A CHARGE
PUMP CIRCUIT EMPLOYED IN FOURTH EMBODIMENT

FIG.9A

TYPE THAT IT OPENS OR CLOSES OUTPUT PATHS
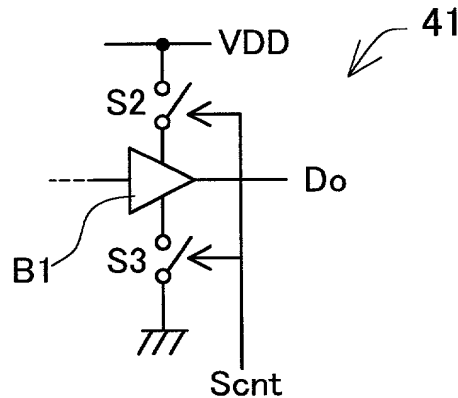

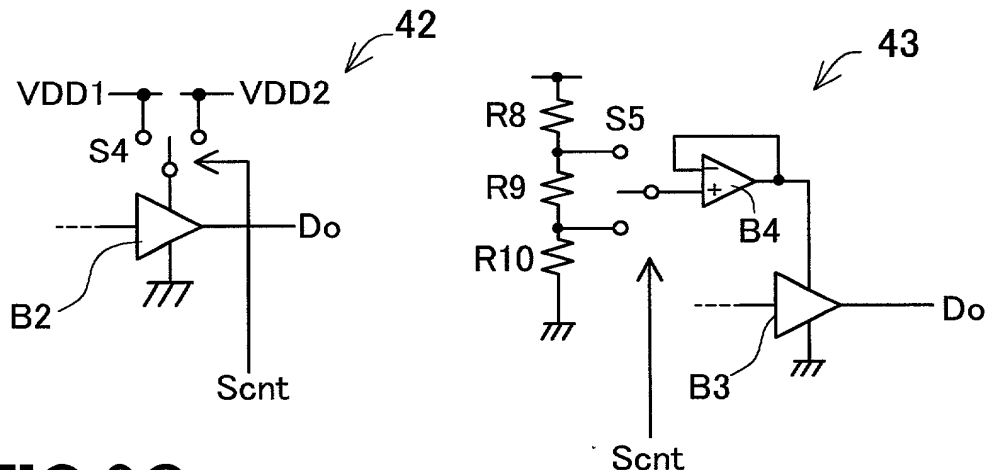# FIG.9B

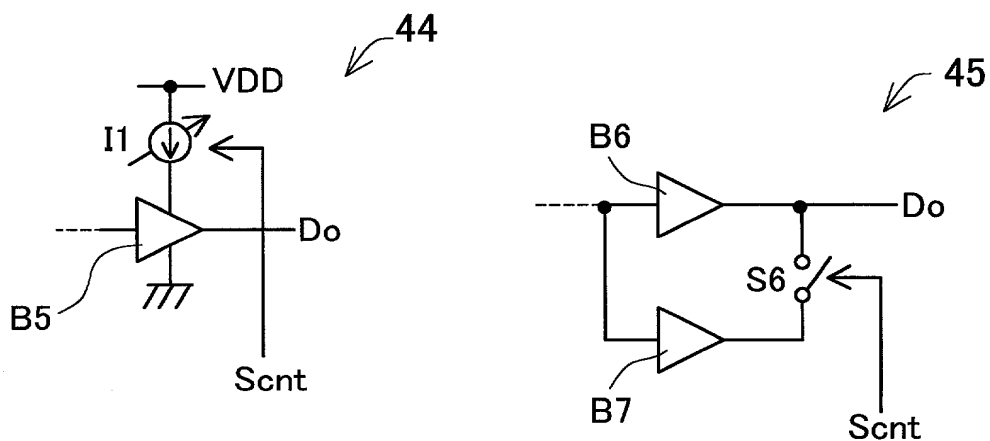TYPE WHEREIN SOURCE VOLTAGES ARE SWITCHED

FIG.9C

TYPE WHEREIN DRIVING CAPACITIES ARE SWITCHED

CIRCUIT DIAGRAM DEPICTING A SPECIFIC EXAMPLE OF
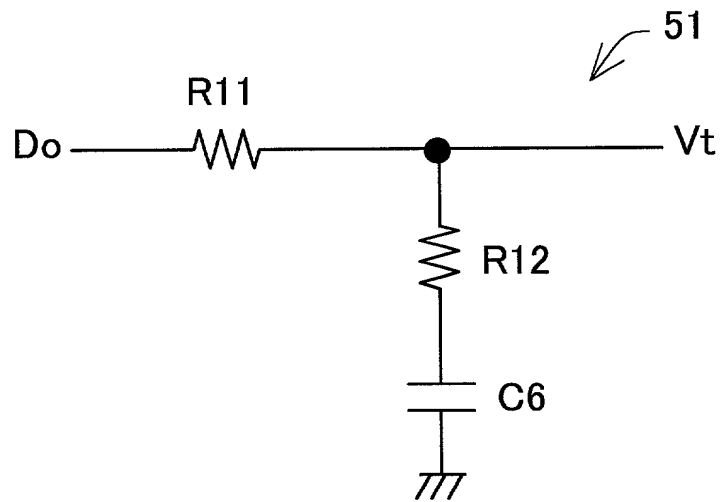A LOW-PASS FILTER (LPF) CIRCUIT

FIG.10A

VOLTAGE-DRIVEN TYPE
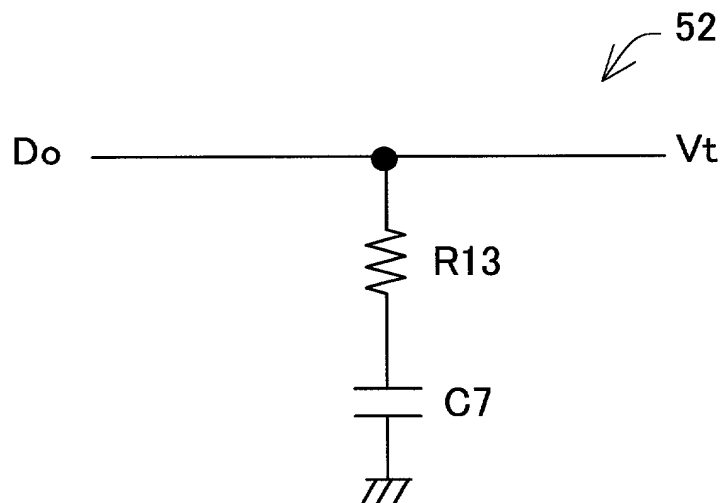

FIG.10B

CURRENT-DRIVEN TYPE

FIG.11 PRIOR ART

FUNCTION BLOCK DIAGRAM SHOWING A PLL FREQUENCY
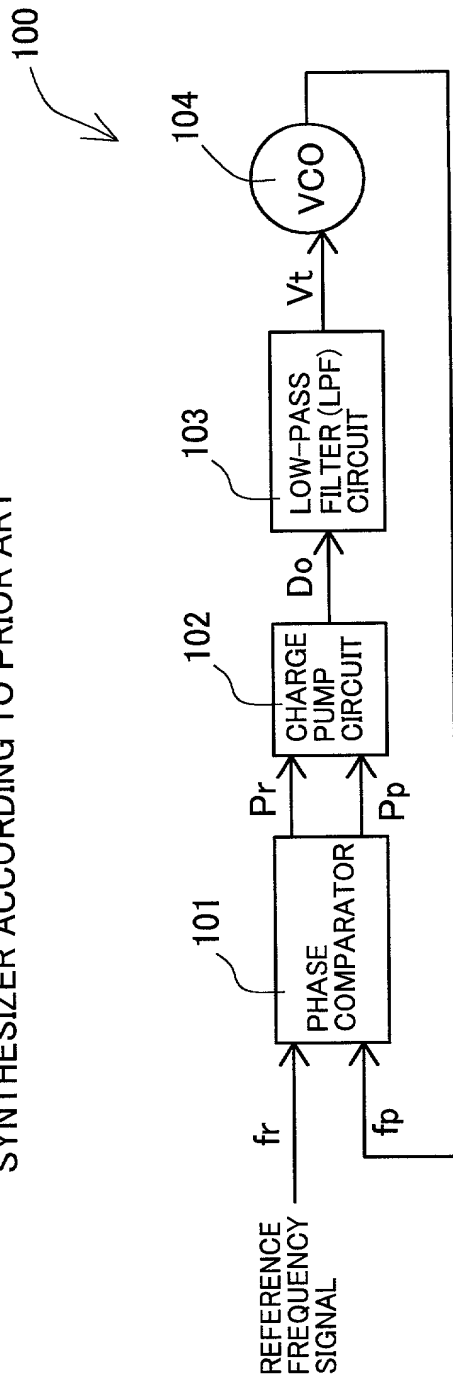SYNTHESIZER ACCORDING TO PRIOR ART

FIG.12 PRIOR ART

WAVEFORM DIAGRAM ILLUSTRATING OPERATING WAVEFORMS OF THE
PLL FREQUENCY SYNTHESIZER ACCORDING TO PRIOR ART

fr

fp

Do

Vt
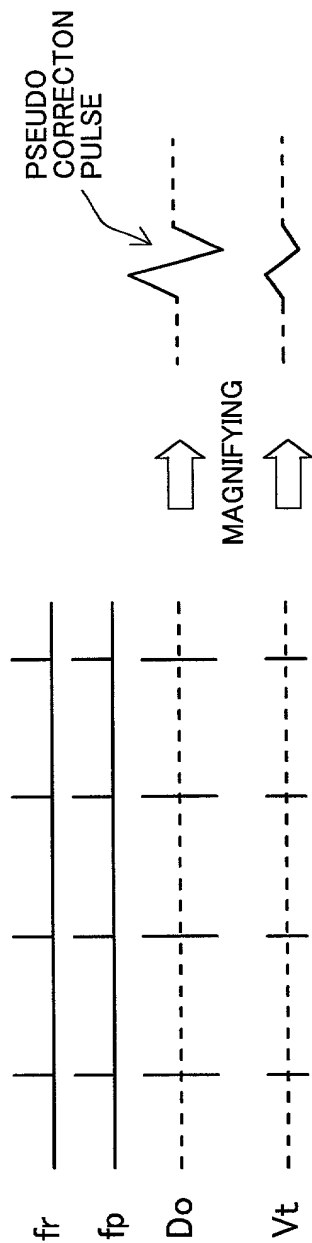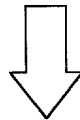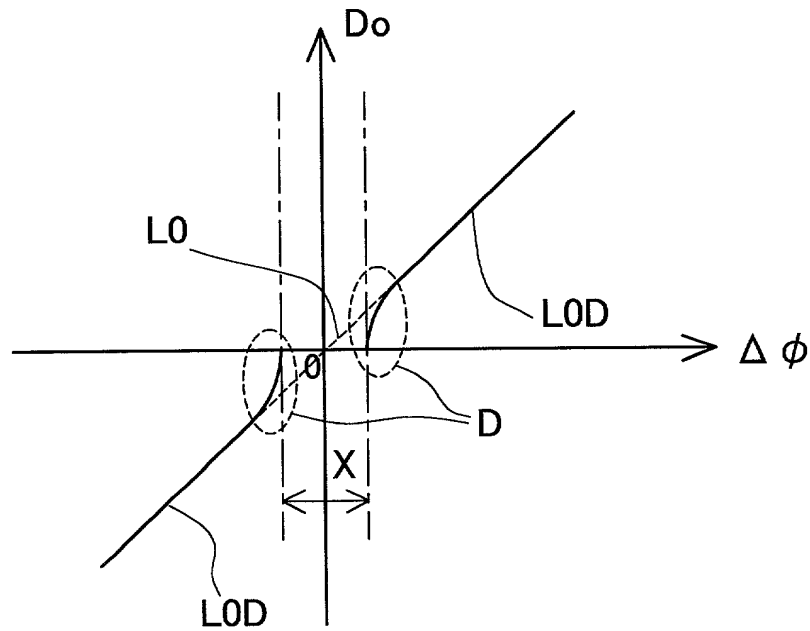
MAGNIFYING

PSEUDO
CORRECTON
PULSE

FIG.13

CHARACTERISTIC DIAGRAM SHOWING INPUT/OUTPUT
CHARACTERISTICS OF A CHARGE PUMP CIRCUIT

SOLVING THE DEAD
ZONAL REGION